01/23/14 Agenda

- Chapter 6 Retake
  - Remediation Packet is posted on my web site, a file with conversion factors has been loaded as well, you have until 1/28 to turn it in.

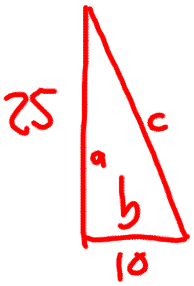
- Finish Sections 7.1 & 7.2
    - The Pythagorean Theorem & its' Converse

- Section 7.4 - Special Right Triangles

- Homework
  - Worksheet 1 - The Pythagorean Theorem (finish the back side)
  - Worksheet 2 - 45-45-90 Triangles

Warm Up Word Problems:

1. You're locked out of your house and the only open window is on the second floor, 25 feet above the ground. You need to borrow a ladder from your neighbor. There's a bush along the edge of the house, so you'll have to place the ladder 10 feet from the house. What length of ladder do you need to reach the window?



$a^2+b^2=c^2$

$10^2+25^2=c^2$

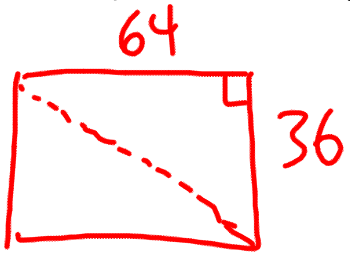
$100+625=c^2$

$725=c^2$

$\sqrt{725}=\sqrt{c^2}$

$26.9=c$

2. A television screen is measured by the length of its diagonal. Bill has an entertainment center that can fit a TV that is 64 inches wide and 36 inches tall. What is the largest size TV that he can get to fit in his entertainment center?



$73''$ SCREEN

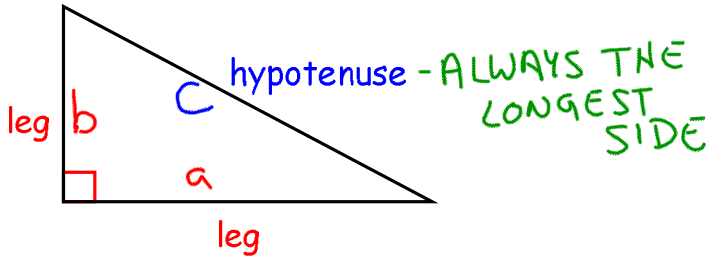
Sections 7.1 & 7.2 - Pythagorean Theorem & it's converse

Target 7A

Goal:	Solve for a missing side in a right triangle using the Pythagorean Theorem.

Todays Takeaways:	1. Solve for missing sides in right triangles.
	2. Given 3 side lengths, determine if a triangle is acute, right, or obtuse using Pythagorean inequalities.
SWBAT	

Terms we need to know when referring to right triangles:



The Pythagorean Theorem states:

In a right triangle, the square of the length of the hypotenuse is equal to the sum of the squares of the lengths of the legs.

Mathematically:

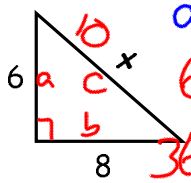
$$(\text{hypotenuse})^2 = (\text{leg})^2 + (\text{leg})^2$$

We shorten this to $a^2 + b^2 = c^2$

where a and b are the legs and c is the hypotenuse.

Find the length of the unknown side (assume right triangles) :

1.



$a^2+b^2=c^2$

$6^2+8^2=c^2$

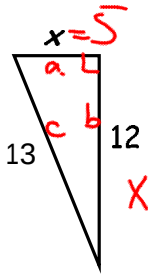
$36+64=c^2$

$100=c^2$

$\sqrt{100}=\sqrt{c^2}$

$10=c$

2.



$a^2+b^2=c^2$

$x^2+12^2=13^2$

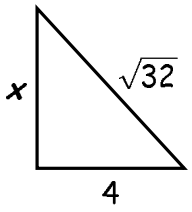
$x^2+144=169$

$x^2=25$

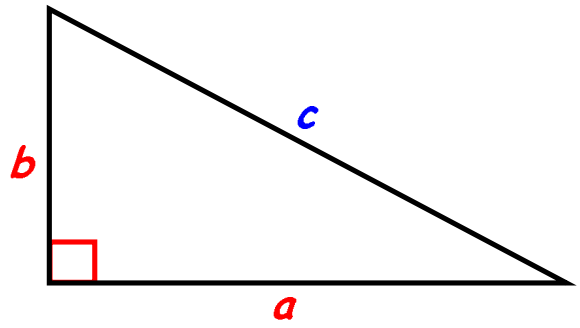
$\sqrt{x^2}=\sqrt{25}$

$x=5$

3.



Section 7.2 - Converse of the Pythagorean Theorem
Target 7A

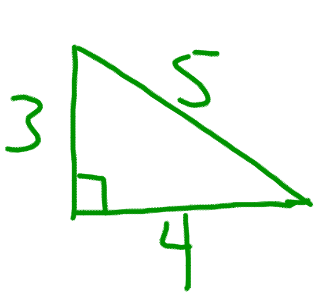


Converse of the Pythagorean Theorem:

If the square of the length of the longest side of a triangle is equal to the sum of the squares of the lengths of the other two sides, then the triangle is a right triangle.

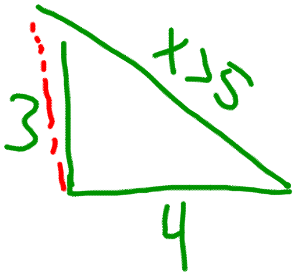
If $a^2 + b^2 = c^2$, then the triangle is a right triangle.

What would happen if c^2 was not equal to $a^2 + b^2$?
What would the triangle look like if c^2 was greater than $a^2 + b^2$?
Less than?



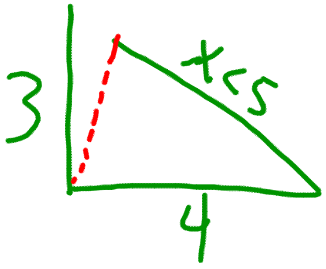
$a^2+b^2=c^2$

RIGHT



$a^2+b^2<c^2$

OBTUSE



$a^2+b^2>c^2$

ACUTE

Section 7.2 - Converse of the Pythagorean Theorem
Target 7A

Converse of the Pythagorean Theorem:

If the square of the length of the longest side of a triangle is equal to the sum of the squares of the lengths of the other two sides, then the triangle is a right triangle.

If $a^2 + b^2 = c^2$, then the triangle is a right triangle.

Also associated with the converse of the Pythagorean Theorem are these two theorems:

If $a^2 + b^2 > c^2$, then the triangle is an acute triangle.

If $a^2 + b^2 < c^2$, then the triangle is an obtuse triangle.

What type of triangles do these sides form?

a.) 9, 40, 41

b.) 3, 4, 5

c.) 4, 8, 9

d.) 7, 8, 14

e.) 1, 3, 12

7, 7, 7

$49 + 49 > 49$

4, 8, 9

$16 + 64 < 81$

Section 7.2 - Converse of the Pythagorean Theorem
Target 7A

Pythagorean Triples: A set of three positive integers that satisfy the equation $a^2 + b^2 = c^2$.

Common Triples:

- 3, 4, 5
- 5, 12, 13
- 8, 15, 17
- 7, 24, 25

3, 4, 5 — 5, 12, 13

6, 8, 10 — 10, 24, 26

9, 12, 15 — 15, 36, 39

12, 16, 20 — ⋮ — ⋮

Multiples of the Triples also work:

Real life applications:

Section 7.4 - Special Right Triangles Target 7B

Goal:	Use special right triangles (45-45-90 and 30-60-90) to find the missing side lehgths.
Todays Takeaways:	1. Be able to apply the properties of a 45-45-90 triangle.
SWBAT	

Section 7.4 - Special Right Triangles Target 7B

A Quick Review of Radicals:

Simplify:

$\sqrt{25} = 5$

$\sqrt{48} = \sqrt{16 \cdot 3} = \sqrt{16} \cdot \sqrt{3} = 4\sqrt{3}$

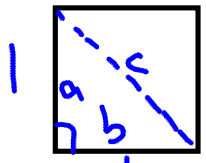
$\sqrt{50} = \sqrt{25 \cdot 2} = \sqrt{25} \cdot \sqrt{2} = 5\sqrt{2}$

$\frac{1}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{2}}{2}$

1
4
9
16
25
36
49
64
81
100

Section 7.4 - Special Right Triangles (45-45-90) **Target 7B** January 23, 2014

Lets take a square, and calculate its' diagonal:



$a^2+b^2=c^2$

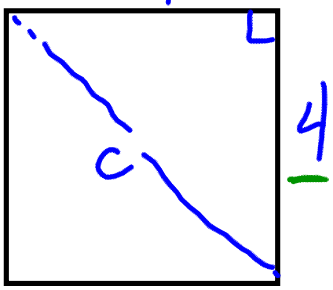
$1^2+1^2=c^2$

$1+1=c^2$

$2=c^2$

$\sqrt{2}=c$

1



$4^2+4^2=c^2$

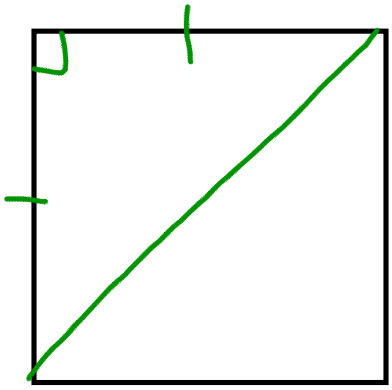
$16+16=c^2$

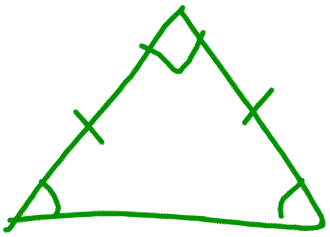
$2 \cdot 16=c^2$

$\sqrt{2 \cdot 16}=\sqrt{c^2}$

$4\sqrt{2}=c$

4





Conclusions?:

Section 7.4 - Special Right Triangles (45-45-90)

Target 7B

January 23, 2014

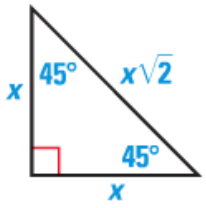
THEOREM *For Your Notebook*

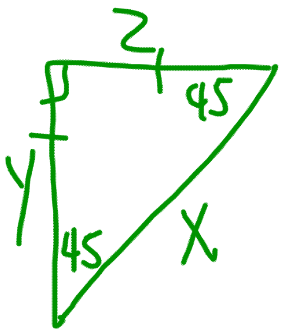
THEOREM 7.8 45°-45°-90° Triangle Theorem

In a 45°-45°-90° triangle, the hypotenuse is $\sqrt{2}$ times as long as each leg.

hypotenuse = leg • $\sqrt{2}$

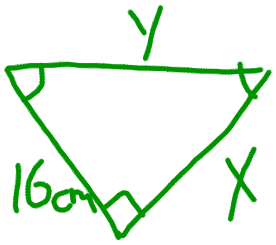
Proof: Ex. 30, p. 463





$y = 2$

$x = 2\sqrt{2}$



$x = 16$ cm

$y = 16\sqrt{2}$ cm